## PLANETARY PHENOMENA FOR JULY AND AUGUST. 1898.

By Professor Malcolm McNeill.

### July.

*Eclipses.* There will be two eclipses during the month, but neither of them will be visible in the United States. The first, on July 3d, is a partial eclipse of the Moon, not quite total. It will be visible over nearly all of the eastern hemisphere. The second is an annular eclipse of the Sun on July 18th. The path of the annulus is entirely in the South Pacific ocean. It will be seen as a partial eclipse in the southern part of South America.

The Earth is in aphelion on the morning of July 2d.

*Mercury* is an evening star, having passed superior conjunction on the morning of June 30th, and during the latter half of the month it sets a little more than an hour after sunset; so it may be seen under good conditions of weather. It makes a very close approach to the first magnitude star $\alpha$ *Leonis* (*Regulus*) on the morning of July 27th during daylight in the United States, but the planet and star will not be far apart on the evenings of July 26th and 27th.

*Venus* is an evening star setting about two hours after the Sun. It moves 33° east and 13° south during the month through the constellation *Leo*, passing 1½° north of *Regulus* on July 13th. Its apparent distance east of the Sun increases 3°, but on account of its great southern motion the interval between sunset and the setting of the planet diminishes about a quarter of an hour.

*Mars* rises earlier than before, only a little after midnight toward the close of the month. It moves 21° east and 5° north in the constellation *Taurus*, and on July 31st is about 5° north of the first magnitude red star *Aldebaran*, $\alpha$ *Tauri*. It distance from the Earth on July 15th is about 160,000,000 miles, and it will be nearly twice as bright as it was during January.

*Jupiter* is still conspicuous in the southwestern sky in the evening. It moves 3° east and south in the western part of the constellation *Virgo*.

*Saturn* is in good position to be seen until after midnight. It moves about 1° westward, and is about 7° north and a little west of the first magnitude red star *Antares*, $\alpha$ *Scorpii*. The outer

minor axis of the rings is just about the same as the diameter of the planet.

*Uranus* is in the same neighborhood as *Saturn*, about half an hour ahead. It moves about 1° westward in the constellation *Scorpio*. It may be found by its proximity to the third magnitude star *β Scorpii*. On July 1st it is about 2° west of the star.

*Neptune* is a morning star in the eastern part of *Taurus*.

AUGUST.

*Mercury* is an evening star and comes to greatest east elongation on August 9th. It remains far enough from the Sun to be be seen under good conditions of weather through the first half of the month, but during the latter half it rapidly approaches the Sun, and it will reach inferior conjunction on September 5th.

*Venus* is still an evening star. The interval between its setting and sunset diminishes about $10^m$ during the month, although it does not reach its greatest eastern distance from the Sun until nearly the close of September. It moves 30° east and 15° south during the month from the constellation *Leo* into *Virgo*, and on August 30th passes about 1° north of the first magnitude star *Spica*, *α Virginis*.

*Mars* rises before midnight at the end of August. It moves about 21° eastward during the month in the constellation *Taurus*. Its distance from the Earth diminishes 20,000,000 miles during the month and at the end is less than 140,000,000. Its brightness will perceptibly increase.

*Jupiter* is rapidly approaching conjunction with the Sun, and at the end of the month can be seen for only a short time after sunset. It moves about 5° east and 2° south in the western part of *Virgo*.

*Saturn* is still in fair position for observation, not setting until late in the evening. It is in quadrature with the Sun on August 29th. It is nearly stationary in the constellation *Scorpi* but after August 9th moves a fraction of a degree eastward.

*Uranus* is also nearly stationary in the same constellation, about 2° west of the third magnitude star *β Scorpii*.

*Neptune* rises before midnight at the end of the month.

## Phases of the Moon, P. S. T.

| | | H. | M. | |
|---|---|---|---|---|
| Full | Moon, | July 3, | 1 | 12 P. M. |
| Last | Quarter, | July 10, | 8 | 43 A. M. |
| New | Moon, | July 18, | 11 | 47 A. M. |
| First | Quarter, | July 26, | 5 | 40 A. M. |
| Full | Moon, | Aug. 1, | 8 | 29 P. M. |
| Last | Quarter, | Aug. 8, | 10 | 13 P. M. |
| New | Moon, | Aug. 17, | 2 | 34 A. M. |
| First | Quarter, | Aug. 24, | 12 | 32 P. M. |
| Full | Moon, | Aug. 31, | 4 | 51 A. M. |

## The Sun.

| 1898. | R. A. H. | M. | Declination. ° | ′ | Rises. H. | M. | Transits. H. | M. | Sets. H. | M. |
|---|---|---|---|---|---|---|---|---|---|---|
| July 1. | 6 | 42 | + 23 | 6 | 4 | 41 A. M. | 12 | 4 P. M. | 7 | 27 P. M. |
| 11. | 7 | 23 | + 22 | 5 | 4 | 46 | 12 | 5 | 7 | 24 |
| 21. | 8 | 3 | + 20 | 26 | 4 | 53 | 12 | 6 | 7 | 19 |
| Aug. 1. | 8 | 47 | + 17 | 58 | 5 | 3 | 12 | 6 | 7 | 9 |
| 11. | 9 | 25 | + 15 | 12 | 5 | 13 | 12 | 5 | 6 | 57 |
| 21. | 10 | 2 | + 12 | 2 | 5 | 22 | 12 | 3 | 6 | 44 |
| 31. | 10 | 39 | + 8 | 33 | 5 | 31 | 12 | 0 M. | 6 | 29 |

### *Mercury.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| July 1. | 6 | 49 | + 24 | 24 | 4 | 40 A. M. | 12 | 10 P. M. | 7 | 40 P. M. |
| 11. | 8 | 17 | + 21 | 35 | 5 | 43 | 1 | 0 | 8 | 17 |
| 21. | 9 | 29 | + 16 | 8 | 6 | 36 | 1 | 32 | 8 | 28 |
| Aug. 1. | 10 | 28 | + 9 | 16 | 7 | 16 | 1 | 48 | 8 | 20 |
| 11. | 11 | 5 | + 3 | 35 | 7 | 33 | 1 | 45 | 7 | 57 |
| 21. | 11 | 22 | — 0 | 3 | 7 | 22 | 1 | 22 | 7 | 22 |
| 31. | 11 | 9 | + 0 | 41 | 6 | 28 | 12 | 30 | 6 | 32 |

### *Venus.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| July 1. | 9 | 6 | + 18 | 30 | 7 | 23 A. M. | 2 | 28 P. M. | 9 | 33 P. M. |
| 11. | 9 | 53 | + 14 | 38 | 7 | 45 | 2 | 35 | 9 | 25 |
| 21. | 10 | 37 | + 10 | 10 | 8 | 5 | 2 | 40 | 9 | 15 |
| Aug. 1. | 11 | 23 | + 4 | 49 | 8 | 27 | 2 | 43 | 8 | 59 |
| 11. | 12 | 4 | — 0 | 16 | 8 | 45 | 2 | 44 | 8 | 43 |
| 21. | 12 | 44 | — 5 | 21 | 9 | 3 | 2 | 45 | 8 | 27 |
| 31. | 13 | 24 | — 10 | 16 | 9 | 20 | 2 | 45 | 8 | 10 |

### *Mars.*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| July 1. | 3 | 2 | + 16 | 16 | 1 | 26 A. M. | 8 | 23 A. M. | 3 | 20 P. M. |
| 11. | 3 | 30 | + 18 | 14 | 1 | 9 | 8 | 13 | 3 | 17 |
| 21. | 3 | 59 | + 19 | 54 | 12 | 51 | 8 | 2 | 3 | 13 |
| Aug. 1. | 4 | 30 | + 21 | 22 | 12 | 34 | 7 | 50 | 3 | 6 |
| 11. | 4 | 58 | + 22 | 22 | 12 | 18 | 7 | 39 | 3 | 0 |
| 21. | 5 | 26 | + 23 | 3 | 12 | 4 | 7 | 27 | 2 | 50 |
| 31. | 5 | 54 | + 23 | 26 | 11 | 50 P. M. | 7 | 15 | 2 | 40 |

*JUPITER.*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| July | 1. | 12 | 10 | + | 0 | 21 | 11 | 30 A.M. | 5 | 31 P.M. | 11 32 P.M. |
| Aug. | 1. | 12 | 24 | — | 1 | 20 | 9 | 47 | 3 | 43 | 9 39 |
| | 31. | 12 | 44 | — | 3 | 31 | 8 | 17 | 2 | 5 | 7 53 |

*SATURN.*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| July | 1. | 16 | 21 | — | 19 | 38 | 4 | 50 P.M. | 9 | 41 P.M. | 2 32 A.M. |
| Aug. | 1. | 16 | 16 | — | 19 | 33 | 2 | 44 | 7 | 35 | 12 26 |
| | 31. | 16 | 18 | — | 19 | 43 | 12 | 47 | 5 | 38 | 10 29 P.M. |

*URANUS.*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| July | 1. | 15 | 52 | — | 20 | 0 | 4 | 23 P.M. | 9 | 12 P.M. | 2 1 A.M. |
| Aug. | 1. | 15 | 49 | — | 19 | 55 | 2 | 19 | 7 | 8 | 11 57 P.M. |
| | 31. | 15 | 50 | — | 19 | 58 | 12 | 22 | 5 | 11 | 10 0 |

*NEPTUNE*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| July | 1. | 5 | 29 | + | 21 | 59 | 3 | 32 A.M. | 10 | 51 A.M. | 6 10 P.M. |
| Aug. | 1. | 5 | 34 | + | 22 | 1 | 1 | 35 | 8 | 54 | 4 13 |
| | 31. | 5 | 37 | + | 22 | 2 | 11 | 39 P.M. | 6 | 58 | 2 17 |

ECLIPSES OF *JUPITER'S* SATELLITES, P. S. T.

(Off right-hand limb, as seen in an inverting telescope.)

| | | | H. M. | | | | H. M. |
|---|---|---|---|---|---|---|---|
| I, R, | July | 2. | 7 47 P. M. | II, R, | Aug. | 7. | 8 6 P. M. |
| III, D, | | 5. | 9 40 P. M. | III, D, | | 10. | 6 38 P. M. |
| II, R, | | 6. | 8 27 P. M. | III, R, | | 10. | 7 51 P. M. |
| I, R, | | 9. | 9 42 P. M. | I, R, | | 17. | 8 14 P. M. |
| I, R, | | 18. | 6 6 P. M. | I, R, | | 26. | 4 37 P. M. |
| I, R, | | 25. | 8 1 P. M. | | | | |
| II, R, | | 31. | 5 31 P. M. | | | | |

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## (TWENTY-NINTH) AWARD OF THE DONOHOE COMET-MEDAL.

The Comet-Medal of the Astronomical Society of the Pacific has been awarded to C. D. PERRINE, Assistant Astronomer in the Lick Observatory, for his discovery of an unexpected comet on March 20, 1898.

The Committee on the Comet-Medal,

J. M. SCHAEBERLE,
WM. M. PIERSON,
CHAS. BURCKHALTER.

May 20, 1898.